PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

A SCIENCE SERVICE PUBLICATION

$5 a year 15c a copy July 14, 1928

"FELLOW"

How Intelligent Is He?

(See page 12)

Vol. XIV No. 379

Fund Sought for Dog Experiments

Psychology

Psychologists at the animal laboratory of Columbia University have issued a challenge to dog lovers.

So many dog owners tell them proudly how intelligent and keen their dogs are and ask so many question about dogs that have not yet been scientifically answered, that the psychologists have asked dog lovers to help them raise a $100,000 fund for experimental work on dogs and also on cats and other higher animals. The fund is known as the Fellow Fund, after the German Shepherd dog recently tested by psychologists at Columbia University. Dr. C. J. Warden, who conducted the examination of Fellow, is chairman of the fund. and Dr. John B. Watson, exponent of behaviorist psychology, is treasurer. Fellow's portrait, by Spencer and Wyckoff, of Detroit, appears on our cover this week.

Much of what the average man "knows" about his own dog, and about dogs in general, is quite unknown to the animal psychologist, Dr. Warden points out. It is difficult for a scientist to enter a dog's world and find out exactly how much a dog depends on sight or smell or hearing in any situation. Because the work is slow and, therefore, expensive, a comprehensive study of the dog's psychology has never been completed.

Experiments so far made indicate that the average dog has far more faulty vision than most dog-lovers suppose, according to a survey of what is known about dog psychology made in the *Quarterly Journal of Biology* by Dr. Warden and Dr. L. H. Warner, his colleague.

Laboratory experiments in Russia and other countries have led most psychologists to believe that the dog has little or no ability to see colors. A puppy that seems to know red from green may be responding to a difference in the brightness of the two colored objects, or some other clue that his human friends overlook. A dog's vision for still objects appears to be decidedly inferior to that of a man, but he is keenly sensitive to moving objects, the evidence indicates.

A dog's sense of smell appears to be far superior to that of a man, the psychologists report in their survey. A German shepherd dog, for example, was able in every instance to pick out a small piece of pine wood that had been handled by her keeper, even when the piece of wood was placed with as many as twenty pieces that he had never touched.

On the other hand, police dogs were tested in Germany by giving them the glove of a person and telling them to pick out the owner from a row of men. The dogs all failed on this test and on a number of other tests intended to prove their usefulness in police work. As a result of the tests the use of dogs in criminal detection was forbidden by the Prussian government. It is not clear, the Columbia psychologists point out, whether the dogs really "understood" what was wanted of them in these tests.

Whether dogs recognize words as a human being does, or whether they respond to sounds, or merely to tones and inflections of the voice, is not agreed upon by experimenters. In tests, Fellow responded to 400 words used in various commands given by his master, Jacob Herbert, of Detroit. In some, cases Mr. Herbert gave the commands from an adjoining room with the door closed, thus showing that the dog did not depend on watching his master's face or gestures for clues. Taking commands through a closed door was new to Fellow, and the voice was muffled, but he made a good record though not a perfect one.

One of the chief reasons why scientists disagree on the dog's capacities is that all sizes and sorts of dogs have been used in experiments, from highly bred bull terriers to an assortment of mongrels, the psychologists point out. A representative breed of dog should be settled upon for systematic study, they suggest.

According to Dr. Charles J. Stockard, of the Cornell University Medical School, the police dog is probably the most nearly "normal" of all common breeds.

Science News-Letter, July 14, 1928

In This Issue—

How *intelligent* is a dog? p. 12—When a star *explodes*, p. 13—*Icebergs* at home, p. 15—*Weather a week* ahead, p. 15—Birds best bears, p. 15—*Mummies* from the Arctic, p. 17—*Magnetic* surgery, p. 17—Vacations for animals, p. 17—*Motoring* on charcoal, p. 17—*Aeronautica nova*, p. 19—Rubber, "Made in Germany," p. 21—*Bios* is inosite, p. 21—*Bittersweet*, p. 21—An amendment to Genesis, p. 25.

SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by Watson Davis.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address all communications to Washington, D. C. Cable address: Sciencserve, Washington.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

Subscription rate—$5.00 a year postpaid. 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

Advertising rates furnished on application.

Copyright, 1928, by Science Service, Inc. Republication of any portion of the SCIENCE NEWS-LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will be gladly sent on request.

INTERPRETING week by week, the latest developments in the various fields of science, this magazine attempts also to present its articles in the most pleasing and readable topography and the most convenient arrangement.

The *clippability*, *indexing*, and *automatic dating* of each article are unique features.

This is a *separable* magazine. Each original article can be clipped or torn out without losing or damaging another important article on the other side. These original articles are backed by reprinted quotations or excerpts, short one-sentence items, advertisements, and other material not likely to be clipped and preserved.

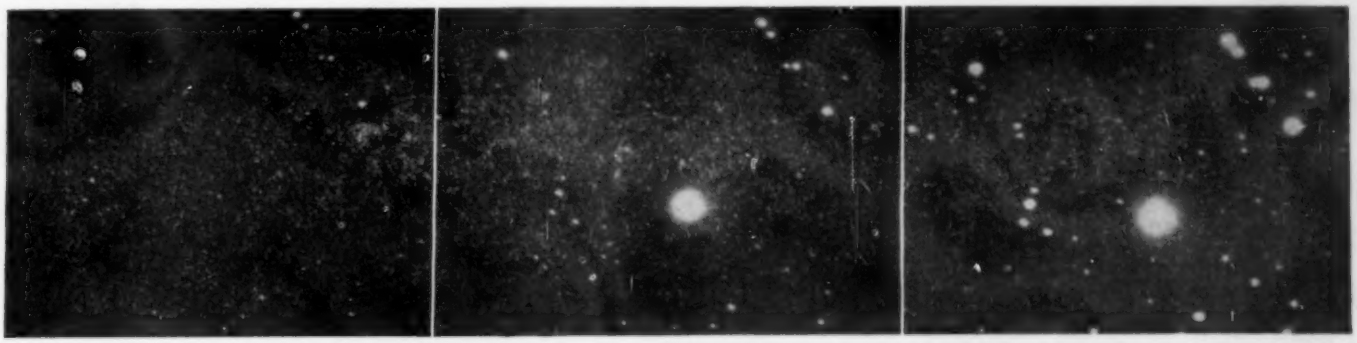
Each article is automatically *indexed* by the key word printed in italics just below the heading, or at the end of the article when the article has no heading. Articles can thus be filed easily into any system of classification, whether it be Library of Congress, Dewey, or one of the reader's own devising.

Each article is automatically *dated* by its last line.

All of the resources of Science Service, with its staff of scientific writers and correspondents in centers of research throughout the world, are utilized in the editing of this magazine.

Exploding Star Astronomical Mystery

Astronomy



AN ILLUSTRATED HISTORY of nova Pictoris, from photographs made at the southern station of the Harvard College Observatory. Left: April 1, 1902; middle: Nov. 6, 1926, more than a year after the outburst; right: Dec. 19, 1927, showing a faint nebulous ring, which is now triple. In the first picture the star is faint and barely visible, but can be located with reference to nearby stars

By James Stokley

One night, several years ago, a telegraph operator happened to work late.

Messages must go over telegraphic lines day and night, so such an event is not uncommon. But this wasn't an ordinary telegraphic operator, and because he happened to work late this particular night there was brought to the attention of the scientific world one of the most remarkable of astronomical phenomena —a new star. The astronomer prefers to speak in Latin, so he calls it a "nova."

A nova is not really a *new* star. It is a star that has continued to shine for an indefinitely long period as an ordinary star, with nothing particularly striking about it to distinguish it from any of its myriads of neighbors. Then, suddenly, for some reason or other, it may become brighter than the brightest star in the sky. It may even become bright enough to be seen in the daytime.

This is what the telegrapher, whose name is Watson, and who lives in South Africa, observed in the early morning hours of that eventful night in 1925. As he returned from his night trick to his home, he looked at the sky, for astronomy was, and still is, his hobby. Low in the southeast was the constellation of Pictor, the painter. This is a group that never rises above the horizon for residents of northern contries. Even to people who live in places south of the equator it is never very conspicuous, for the brightest star in it, ordinarily, is of the third magnitude.

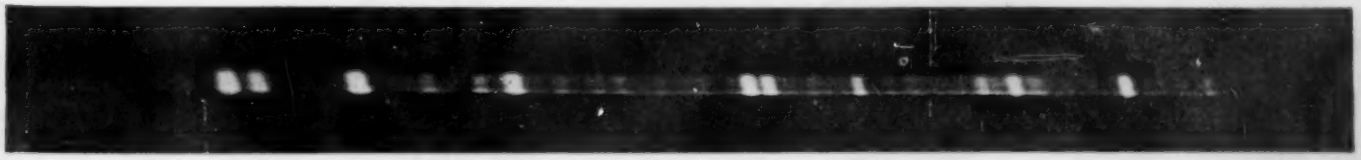
Watson looked at the constellation of Pictor in astonishment. For there was in it a bright star that he had never seen before, and about the same brightness as alpha Pictoris, the member of this group that is ordinarily the brightest.

As anyone should do who discovers something unusual in the sky, he immediately notified the nearest observatory, and from there the news was cabled to astronomers throughout the world. Astronomers in the southern hemisphere trained their telescopes on the strange apparition, and watched it, photographed it, and analyzed its light with their spectroscopes. Astronomers in the northern hemisphere, unable to see it, discussed it, and anxiously awaited further reports from the South, for it was the brightest nova that had appeared in many a year.

It soon became apparent that the discovery of this nova had some unique features. In the first place, a new star is not usually discovered until it has just about reached its greatest brightness. Many novæ have only been noticed after that, when their light had started to diminish. But thanks to Watson's keen eyes, nova Pictoris was found before maximum. For days after Watson's discovery it continued to brighten, until, by June 7, it was of the first magnitude. Then it was about as bright as Spica, the bright star in the constellation of the Virgin, in the southern sky in nights of the late spring. Early in July it had almost declined to the fourth magnitude, when it started to brighten again. By July 27 it was nearly of the first magnitude. Again it became fainter, going below the third magnitude by August 4. But once again it brightened, and five days later, on August 9, it was nearly as bright as on July 27. Since that time it has continued, on the whole, to get fainter, though the curve of its brightness—what the astronomer calls the light curve—shows great irregularities.

What was observed to happen in the spring of 1925 is a question that astronomers are still discussing.

The Harvard College Observaotry maintains a branch station in Bloemfontein, South Africa, to keep track of such stellar events as this, which cannot be seen from the United States. A few months ago Dr. John S. Paraskevopoulos, former astronomer of the Athens Observatory, who is now in charge of the Harvard branch *(Turn to next page)*



A CODE MESSAGE FROM THE STARS. The spectrum of nova Pictoris, obtained by the Harvard Observatory's southern branch by passing its light through the prisms of a spectroscope. To the astronomer, who can decode this cryptic message, is revealed a large part of the star's history. The red end is towards the left

Exploding Star an Astronomical Mystery—*Continued*

AN IMAGINARY DRAWING showing how nova Pictoris might appear if we were sufficiently close to it

reported to his headquarters in Cambridge that the star was surrounded by a nebulous ring.

Then word came at the end of March that another South African astronomer had observed the star to be double, consisting of two components, of similar brightness, and each rather nebulous. The ordinary star image is a sharply defined point of light. Their distance apart was said to be about half a second, which is one thirty-six-hundredth of the diameter of the full moon. Dr. Paraskevopoulos reported to Cambridge right after this that photographs he had taken did not reveal the extra star but that may have been because the two were so close together. The Johannesburg telescope is much larger than any that have yet been installed at the Harvard station.

One of the latest chapters in the strange history of nova Pictoris was written with the discovery of Dr. Harry E. Wood, also at Johannesburg, that the star is surrounded by a large ring, about a tenth of the moon's diameter, inside of which are two others.

In the history of past novæ, such an effect has been observed, and has been interpreted as waves of light emanating from the exploded star. That is, there is already material of some kind around the star before it bursts out, but as it is dark, we are not aware of its presence. Then, whatever causes the stellar explosion, there is a sudden flash of light. As the light waves travel outward they illuminate this dark material, from which the light is reflected to the earth. Light travels fast enough to encircle the earth seven times in a second, but from our distant point of vantage we can see the gradual illumination of points farther and farther from the nova as the light waves advance.

This effect was first discovered by Prof. George W. Ritchey, an American astronomer then at the Yerkes Observatory, in the case of a nova that appeared in the northern constellation of Perseus.

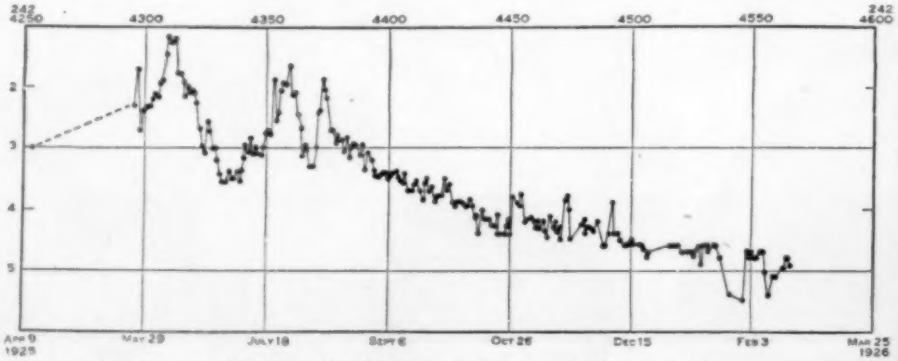
The rings around nova Pictoris, however, are probably not so caused. If they are due to light, it should not have taken almost three years for them to become apparent, unless the thing is much farther away than most astronomers suppose. Probably the rings are actual matter, thrown out from the star when it exploded. The fact that there are three rings may be due to the stuff that left the surface of the star at the first outbreak, seen on June 7, causing the outer ones, while the inner ones consist of stuff that left at the later explosions of July 27 and August 9. Another suggestion, made by Dr. Harlow Shapley, director of the Harvard Observatory, is that the material all left at the same time, but that it was of three kinds, the lightest traveling fastest and farthest, and so causing the outer ring, while the inner ones are due to heavier matter. Future observations of the relative distance of the rings will answer this question.

Since the appearance of these rings, there has been another suggestion to account for the appearance of two stars. Perhaps the stuff thrown out is not uniformly distributed in all directions, but most of it went in one particular way. This might now be gathered into a condensation that, with relatively small telescopes, might seem like a companion. A larger telescope would show its true character, possibly much like that of the illustration. Unfortunately the phenomenon occurred before the big 60" reflecting telescope, that is being constructed for the Harvard Observatory branch, is in use. At present there is no large reflecting telescope, comparable with the great instruments at Mt. Wilson, in the southern hemisphere, and so nova Pictoris cannot be studied with the biggest telescopes.

A new star is by no means a rare occurrence. At the Harvard College Observatory, where an elaborate file of astronomical photographs is collected, it had been found that, on the average, there are ten novæ a year. Most of these, it is true, are much too faint to be seen with the naked eye, and one of the brightness of nova Pictoris is uncommon. Not since 1918, when such a new star appeared in the constellation of Aquila, the eagle, had such a bright one been observed.

But the fact that most novæ are faint does not mean that they are not as violent as nova Pictoris or nova Aquilæ. It simply means that they are so far distant that they appear faint, and, if we were as close to them as we were to the most famous ones, they would doubtless look as bright.

Perhaps the catastrophe of nova formation can occur to any star. There are about a billion stars within reach of a great telescope, and if there are ten times this many that may become novæ, it would mean that, on the average, every star would be a nova once in a billion years. Vast though this period of time may seem, *(Turn to Page 19)*



LIGHT CURVE OF NOVA PICTORIS as plotted by the Harvard Observatory, showing how it brightened three separate times

Coast Guard to Study Icebergs' Home

Oceanography

The birthplace of the icebergs that menace trans-Atlantic shipping, the waters between Labrador and Greenland, will be studied during the coming summer by an expedition sent out by the U. S. Coast Guard. From the observations made it may be possible more accurately to predict the path of these bergs and how and where they drift.

Already their wanderings as they pass southward are faily well known. This is a result of the International Ice Patrol's regular observations since 1912, when the Titanic disaster focused the attention of the world on their danger. The work to be done this summer is expected to complete the knowledge of their history, by furnishing now unknown facts regarding the conditions at their source.

The expedition will be made in the Coast Guard vessel Marion. It will be under the command of Lieutenant Commander Edward H. Smith. He has had ten years' service in the ice patrol work, and is also a trained oceanographer, for he spent two years in Europe and several more at Harvard University in oceanographic research. Lieutenant N. G. Ricketts is his first officer, and he also has had extensive experience in the ice patrol.

After April 15, 1912, when the White Star liner Titanic struck an iceberg off the Grand Banks of Newfoundland and went to the bottom, with a loss of 1,500 lives, an international convention "for the safety of life at sea" was held at London. From this there resulted the Ice Patrol of the U. S. Coast Guard. Every March two staunch Coast Guard vessels sail from Boston to the ice fields, and remain there until the dangerous season is over, usually about the middle of July. Twice a day these boats broadcast by radio to nearby liners the location of all the ice in the vicinity, so that they can head southward to safety. Since the Coast Guard began this work fourteen year ago only three lives have been lost by collision of a ship with ice.

The science of oceanography has helped to a great degree in solving the problem of making ships more safe in the ice field, Commander Smith told Science Service. "Little was known," he said, "before 1912-14 regarding the drift of the bergs, their rate of melting, and the degree of danger which they formed to passing traffic; except for the fact that they mostly came from Greenland and that they finally melted in the off-shore waters of the Atlantic, which appeared to be considerable of a mystery.

"Over 3,000 observations," he continued, "have been compiled during the last ten years by the ice patrol vessels. The program has consisted in securing observations of temperature and saltiness at various depths in various positions, carefully selected in the danger area. The ocean currents have been computed from these data in accordance with a mathematical formula. It is based upon the principle that ocean currents are due to differences in the specific gravity of the water. Water will flow from the place where it is relatively light to another region where it is proportionately heavy. This, combined with the fact of earth rotation, permits us to issue regular weekly current maps, similar to the *(Turn to next page)*

Seven-day Weather Forecasts Coming

Meteorology

Weather forecasts for a week in advance may soon be possible. A new system of weather predicting that for 2 to 7 days in the future was right more than seven times out of ten was announced recently by Charles L. Mitchell, Washington district forecaster of the U. S. Weather Bureau.

At present the new system is not used in the daily work of the Weather Bureau, but for nearly a year the improved forecasts have been made experimentally each week and checked in order to determine the value of the method. The storm centers of the whole northern hemisphere for four successive days are charted on a map. Then from his knowledge of the habits of storms, Mr. Mitchell predicts where these storms will be each day for a week in advance. Giving due consideration to the probable severity and other characteristics of the storms, he is then able to issue forecasts for rain and temperature within the eastern half of the United States. For many years the Weather Bureau has issued each Saturday morning an outlook in which is given the probable weather and temperature changes for the coming week, but the forecasters have not been satisfied with the record of verifications made. The new method devised by Mr. Mitchell gives results nearly twice as reliable for some of the weather factors.

The first storm to make a trip around the world, so far as weather records show, was also reported by Mr. Mitchell. It brewed in Montana on February 23, 1925, and after traveling 21,379 miles in encircling the globe dissipated over the Gulf of St. Lawrence on March 23. A recent study of weather data revealed this world's record.

Science News-Letter, July 14, 1928

An ostrich egg would make an omelet for eight people.

Pennsylvania is planning to establish a game farm to breed pheasant and wild turkey.

Birds War on Bears

Zoology

Yellowstone Park ravens and magpies evidently never heard of Elisha; at any rate they certainly have no fear of bears.

Ranger Thad Pound was making his rounds a short time ago when he noticed a great commotion among a flock of ravens and magpies. Upon investigation he found that the center of the disturbance was a very much distressed she bear with a pair of cubs, which were receiving the mauling of their lives from the birds' beaks. The cubs were rolled over on their backs, trying to defend themselves with their paws, while the mother was hard put to it to shield her lustily bawling offspring.

The occasion of the battle was the carcass of a winter-killed elk, on which the birds had evidently been feasting. Interrupted by the bears, they had resented the intrusion and turned to do battle with the uninvited guests.

Science News-Letter, July 14, 1928

There are about 26,000 miles of fishing streams in California.

To Study Icebergs—*Cont'd*

better-known weather maps issued daily by the U. S. Weather Bureau.

"In the course of this work we have secured a quite correct picture of current and ice conditions in the immediate area south of Newfoundland, and near the steamship tracks, but little is known of the wild and unexplored stormy region northward between Labrador and Greenland. Our expedition will enter these foggy waters and, it is hoped, will snatch from them a long-continued mystery."

Does a branch of the Gulf Stream dive to the bottom of the Atlantic Ocean and emerge again far north in Baffin Bay? Is the Labrador Current a continuous overflow from the Arctic Ocean? Does the east Greenland current stretch all the way across to Labrador? Why is the west coast of Greenland so much warmer climatically than Baffin Land in the same latitude?

These are some of the outstanding questions of Arctic oceanography that may be solved during the coming summer as a result of the expedition.

Science News-Letter, July 14, 1928

The world's automobile population is now 29,687,499 cars.

Hot springs are used to supply water for laundries in Iceland.

Staff of Science Service—Director, Edwin E. Slosson; Managing Editor, Watson Davis; Staff Writers, Frank Thone, James Stokley, Emily C. Davis, Jane Stafford; Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

Board of Trustees of Science Service—*Honorary President*, William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, *President*, Editor, Science, Garrison, N. Y.; D. T. MacDougal, Director, Desert Laboratory, Tucson, Ariz.; M. I. Pupin, Professor of Electromechanics, Columbia University, New York City. Representing the National Academy of Sciences, John C. Merriam, President, Carnegie Institution of Washington; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; Dr. David White, Senior Geologist, U. S. Geological Survey. Representing National Research Council, Vernon Kellogg, *Vice-President and Chairman of Executive Committee*, Permanent Secretary, National Research Council, Washington, D. C.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio

THREE-IN-ONE
PUBLICATION

The dynamics of instant and extensive publication are enjoyed if you publish in any of the following journals:

Journal of Morphology and Physiology
The Journal of Comparative Neurology
The American Journal of Anatomy
The Anatomical Record
The Journal of Experimental Zoölogy
American Journal of Physical Anthropology
The American Anatomical Memoirs
The Biological Bulletin (M. B. L., Woods Hole, Mass.)
Folia Anatomica Japonica (Tokio, Japan)
The Journal of Parasitology (Urbana, Ill.)
The Australian Journal of Experimental Biology and Medical Science (Adelaide, South Australia)
Stain Technology (Geneva, New York)
Physiological Zoölogy (Chicago, Ill.)

Why?

1. Because the author's abstract of every article is printed immediately and extensively distributed in the Advance Abstract Sheets of The Wistar Institute Bibliographic Service.
2. Because The Wistar Institute Bibliographic Service Card giving the author's abstract and the complete bibliographic reference is published shortly after the Advance Abstract Sheet is issued.
3. Because the complete article then appears promptly in one of the above journals.

Reprints supplied.

Advance Abstract Sheets.....$3.00 per year
Bibliographic Service Cards.....$5.00 per year

ADDRESS
THE WISTAR INSTITUTE OF ANATOMY AND BIOLOGY
Thirty-sixth Street and Woodland Avenue :: Philadelphia, Pa.

Flag Day in Spain

Travel

E. Allison Peers, in *Santander* (Knopf):

Perhaps he (the stranger) would be more edified by a Spanish flag day, if he is interested in national psychology. There is usually a festival of the flower, as it is called, in Santander during August, though it is a much more alarming event than the foreigner might expect. To say that he is "buttonholed" at an early hour is to describe exactly what happens: a couple of girls will make a dash at that part of his apparel so soon as he appears in the streets, and having successfully pinned a paper flower to it, will calmly await their reward. If he thinks, however, that this will render him immune from attack all the day, he is greatly mistaken. Wherever he goes, he is besieged. As he looks in a shop-window, a flower is slyly pinned in his coat, and another penny requested. As he sits outside a café sipping his drink (a peaceful prisoner, for the shoeblack is cleaning his boots), three more barefaced maidens see their chance, and decorate him further. He waits for a tram and from behind a giant plane-tree comes another seller of flowers; he dismounts from one and is promptly "flagged" again. Along the Blanca, where there is a flower-seller to every few yards, you may see genial Spaniards with ten, twenty, or even thirty flags of different colours about their person; not only in the lapels of their coats, but all over the coats themselves, waistcoats, hats, and even shirts and ties. I shall always hope some day to meet a philanthropist who has scored a century, and has paper flowers affixed to his boots.

The little flower, then, in Spain, is anything but a badge of immunity; it rather indicates the extent to which the wearer can be imposed upon. This is really peculiarly characteristic of Spain. The idea of giving as much as one can afford at one time has no attraction for people many of whom really prefer giving to a beggar than to a hospital. They give profusely and generously, but they give as they are moved at the moment.

Science News-Letter, July 14, 1928

Arctic Mummies in National Museum

Anthropology

Three mummies from the Arctic caves of the Aleutian Islands, similar to those just discovered by the Stoll-McCracken Expedition, have been in the possession of the U. S. National Museum for more than 50 years.

The museum had a number of these strange mummies that date back to about the seventeenth century, before the white man penetrated the Arctic. For a time some of them were on display. But they are rather gruesome exhibits and they had a somewhat morbid fascination for the public, so they were finally macerated and the skeletons were measured and examined to add to the government scientist's knowledge of ancient men in America.

The three mummies that have been preserved intact in their burial robes and wrappings are those of an adult, a child of about ten years, and a young infant.

A careful study of the Arctic burials was made by Dr. William H. Dall, of the Smithsonian Institution, in the 1870s. The islanders were loath to talk about the ways of their ancestors. But Dr. Dall wandered through the maze of rocks and caverns, and discovered a number of the mummy caves. The bodies were wrapped in skins and grass mats and hidden in the caves, partly because the islands afford few good places for interment, and partly because the caves offer the best protection against the chill fog and dampness of the region. Secrecy was important, because the body of a famous whaler of the tribe, or even the possessions of a whaler, would bring skill in whaling to anyone who possessed them. To foil robbers and to keep the skill of the dead hunter in his family, the dead man was entombed as cautiously as possible.

ONE OF THE ALEUTIAN MUMMIES in the U. S. National Museum at Washington

A rarer type of mummy than those wrapped in skins and mats has been seen in the islands by explorers, but no specimens have ever been brought away. These mummies are not encased, but have been placed in the caves in positions resembling life. Dead men clad in wooden armor, it is said, stiffly grip their spears as they wait to fight the shadowy enemies of another world. Dead women sit holding their bone needles and embroidery as in life. *(Turn to next page)*

Vacations for Animals

Zoology

A country zoo, where tired animals of the London Zoo can go for a holiday and where sick animals can go to recuperate, is proposed in a bill considered by the British Parliament.

The estate which would be set aside for the animals covers 480 acres and provides enough room for the animals to exercise in surroundings somewhat like their natural home country. The holiday home for the wild animals would be about 40 miles from London.

Science News-Letter, July 14, 1928

Charcoal-Driven Autos

Engineering

The use of charcoal for producer-gas as a propellant for motor vehicles is being seriously considered in Great Britain. The Forests Products Research Laboratory have already conducted preliminary experiments on various methods of preparing charcoal for this purpose. So far they have investigated two French types of portable kilns, and also the more ordinary type of bee-hive kiln. Arrangements have been made with the Fuel Research Station to carry out tests on the charcoal prepared from various species of timber, and to determine its value for producer-gas.

Science News-Letter, July 14, 1928

Magnet Removes Bullet From Lung

Medicine

The problem of removing an awkwardly located German bullet from the lung of a Canadian soldier where it had been reposing for ten years was solved by Dr. Chevalier Jackson, at his bronchoscopic clinic in Philadelphia by means of a magnet.

During an action in 1918 the soldier was wounded in the jaw. The fracture united, the wound healed and the patient was honorably discharged. After several years a cough developed, with considerable pain in the the left side of the chest. X-ray examination showed a machine gun bullet in th eupper lobe of the left lung. The soldier's history indicated that there had been no way for the bullet to enter the body except through the wound in the jaw, so the doctors concluded that the bullet had been nearly spent when it struck the jaw bone and had been carried into the lung by an indrawn breath.

By means of X-rays and the bronchoscope, an instrument which enables the operator to look directly into the lung, it was found that an abscess-like cavity had formed around the bullet. When bronchus forceps were inserted into this cavity, however, they shoved the bullet up into a "round the corner" position where the operator could not possibly get a grasp on it.

Since the bullet was presumably covered with steel Dr. Jackson decided to see what a magnet would do. In order to be influenced by a magnet an object must have steel, nickel, cobalt or magnetic iron in its composition. This excludes about 90 per cent. of the foreign bodies removed from the air and lung passages, and for this reason magnets are seldom used in bronchoscopic work. In this case the bullet proved responsive and by maneuvers with the magnet outside the man's chest the bullet was drawn into a favorable position and withdrawn through the throat and mouth, after which the patient made a successful recovery.

Science News-Letter, July 14, 1928

Science in general has needed an interpreter to translate it into the terminology of the man on the street, and that is one of the great functions of industrial research.

CHARLES F. KETTERING.

Science News-Letter, July 14, 1928

Arctic Mummies—*Cont'd*

And old men have sat for centuries posed beside their drums, as if waiting to play for the winter dances.

Science News-Letter, July 14, 1928

Ants sometimes raid beehives, killing off large numbers of bees.

Ages ago, when the earth rotated faster than it does now, a day on the earth was much shorter than our 24-hour day.

An average of 1,000 live birds from foreign countries enter the United States each day, mostly for zoos and cage pets.

The only insects that man has ever set to work on a large scale directly for him are the honeybee and the silkworm.

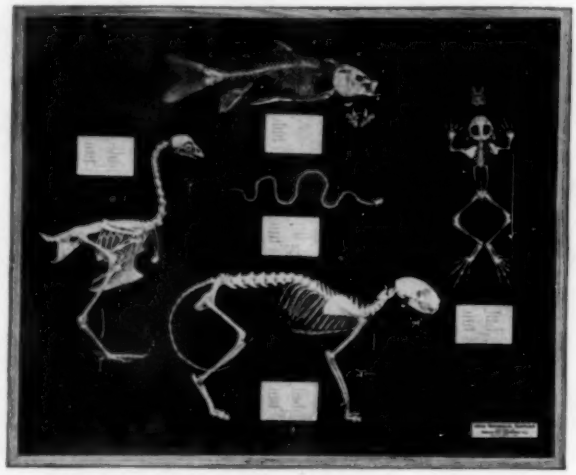
The brain of Dr. William Osler, famous physician, has been weighed and pronounced slightly heavier than that of the average person.

The Frenchman, Frans Mesmer, who preached the healing power of magnetism, sold magnets as remedies for headaches and other ills.

High Grade Prepared Skeletons

At Favorable Prices

Satisfaction Guaranteed



Of the extensive line that we prepare and carry in stock, the following select items are favorites with High School and College instructors:

Z013	Squalus, cartilaginous, in museum jar	$25.00
Z030	Necturus on base	11.00
Z061	Bull Frog in glass	12.00
Z066	Grass Frog in glass	6.50
Z0105	Turtle, 8" to 10"	12.50
Z0116	Alligator on base	25.00
Z0130	Chicken on base	16.00
Z0135	Cat on base	18.00
Z0195	Monkey on base	25.00

We have frequent calls from High Schools for a set of vertebrate skeletons mounted in a hardwood glass-covered wall case, size 24x32". This set includes the Perch, Pigeon, Turtle, Rat and Grass Frog, price $53.00.

The larger set with specimens as illustrated above costs $75.00.

Our skeletons are excellent for class use as well as for building up the permanent school museum.

Write for complete list and for biology catalog No. 5B.

DENOYER-GEPPERT COMPANY

Makers and Importers of Anatomical Models, Charts, Skeletons, Specimens and Slides

5235-57 Ravenswood Avenue **Chicago, Ill.**

An Antidote for Specializitis

General Science

Editorial in *Chemical and Metallurgical Engineering:*

When the "popular" style of literature on the "marvels of chemistry" was a novelty, it wasn't so bad. A certain amount of "hokum" was expected and tolerated by educated readers because it was recognized that the prime mission of such treatises was to interest and inform the lay public. Now that the novelty has worn off, however, the diet begins to pall. One sighs a bit over the "laid-end-to-end" figures, turns the page and hopes. Then "suppose the atom were enlarged to the size of a hickory nut" provokes a restrained yawn, but hope still lingers. Eventually, however, the inevitable happens, for without so much as inviting us to "stop me if you've heard it," the author presents an intimate account of his private life, beginning with the chemically active first rays of the sun shining through chemically made glass, on synthetic-dyed draperies, artificial leather slippers, etc., continuing through a Thorpe Dictionary day to a chemically pure but contagious slumber. One is tempted to speculate that if all the "chemical days" thus chronicled were laid end to end . . . but perhaps that is unkind.

Let no one underestimate the tremendous progress made in the past decade in educating the layman to an appreciation of the ubiquitous benefits of science, particularly of chemistry. Let no one scoff at the ingenious art of making first page news of technical developments. Let us freely acknowledge the genius of those scientifically trained men who saw in this field their mission, and are effectively materializing their vision. Such recognition involves no inconsistency, for we are confident that Dr. Edwin E. Slosson, for instance, will never knowingly tell us the story of his "chemical day." In fact he is quick to recognize the existence of a great group of readers who are loath to wade through "a long-passed freshman course in elemental science all tangled up with what might be one really meaty bone of new fact."

The announcement that Doctor Slosson is preparing a series of books written "straight across" to a discriminating group instead of being "written down" to a relatively unschooled reader, is interesting and promising. Such a series will find a welcome with the well-educated reader who wants to know something about what is going on outside his own specialized bailiwick. Perhaps it may even revise the curriculum of the "popular" school of literature and relegate such old favorites as "And so the ancient alchemists were not so far wrong after all," to an appropriate place beside the daily bed-time story.

Science News-Letter, July 14, 1928

Nine states have a population each of less than 500,000 people.

Diseases cut down the cotton crop last year by nearly 15 per cent.

Exploding Star an Astronomical Mystery—*Continued*

it is small compared with the lifetime of a star, and so many stars may have been novæ several times in their history.

Whether the sun has been a nova or not, or whether it will become one a year, a hundred years or even a million years hence, no astronomer can say. After a new star has burst out, it gets fainter again, and finally ends up pretty much the same as before the explosion occurred.

What is the cause of a nova? One of the first of the modern theories was that the outburst is due to the collision of two stars. All the stars are moving, and occasionally two might hit. Travelling at immense speeds, something would be bound to happen when they hit, and thus, it was said, caused the appearance of a nova. Simple as this theory might seem, it has one serious objection. The distribution of the stars in space is known, and they are so scattered that such a collision could not occur oftener than about once in a million years. And novæ happen much oftener than that.

Nova Pictoris, however, is unusual in more ways than one, and presents peculiarities never before observed in a nova. One is the doubling. Another is the multiple system of rings that has appeared. The third is the slowness of the changes. The usual nova returns pretty much to the *status quo* within a few months after the otburst, but here is nova Pictoris, three years later, and still of the seventh magnitude, far brighter than it was before it blew up. In fact, some astronomers think that possibly it may never return to the original brightness. This all indicates that something pretty serious happened to it, and different from the usual run of novae. Some astronomers have expressed the opinion that this is an actual collision. Perhaps, despite the infinitely remote chance estimated at once in 10,000,000,000 years, the thing has actually happened before the eves of present-day man.

Another theory, that is widely accepted, takes account of the dark stuff that is scattered through the stellar system. These dark nebulæ, as they are called, are only visible when they happen to be in front of some brighter objects. Then we can see the outline of the dark stuff. Elsewhere it is probably present, though it is not visible. If a star comes along, and enters a cloud of this dark matter, the friction created will cause an outburst such as that of a nova. The alternate brightening and fading several times, as occurred in nova Pictoris, would be explained on this view as the result of the star encountering denser and rarer portions of the dark nebula.

But the latest ideas of astronomical science propose quite a different sort of origin, at least, for the typical novæ. Instead of the energy of outburst coming from outside sources, it is within the star itself, stored up in the atoms of which it is constituted. As yet physicists, and astronomers also, confess themselves in the dark as to just how this store of energy operates, but the continuous emanation of energy from radium, as it breaks up into simpler elements, gives a glimpse of the energy in the atoms.

What would cause this stored energy to be suddenly released at a given time? One suggestion is that the collision not of another star, but a small body, perhaps no larger than a meteor, might act as the trigger to set off the explosion.

Prof. Henry Norris Russell, famous Princeton astronomer, has given a picture of the way this might occur. A meteor hits the star, and travels deep into the star's interior before encountering layers dense enough to stop it. Then the energy that it had by virtue of its motion is changed to heat and a "pocket" of extremely "hot stuff" is formed. It might be millions of degrees in temperature. This great temperature might then cause further release of energy from the atomic sources, then the gases of which the star is made at that point expand so rapidly that there is a literal explosion, carrying with it the higher layers of the star. This causes an expanding shell of matter that seems to be characteristic of all novæ.

After the explosion the temperature drops back to an ordinary stellar magnitude, the pressure is relieved, and, on the whole, the star is pretty much the same as before. True, the great amount of heat suddenly liberated might travel to a set of planets surrounding the star. There might even be living creatures on the planets who would be instantly killed. But this is a trivial incident. What are a few million human beings compared to the life history of a star?

Science News-Letter, July 14, 1928

The first person to have his portrait on a coin was Alexander the Great.

New Airship Era Seen

Aeronautics

Remarkable demonstrations of the airship will be made before the end of this year, Gilbert Betancourt, airship engineer of Detroit, predicted to the aeronautic division of the American Society of Mechanical Engineers at its recent Detroit meeting.

"Two British airships and one German, all larger and better than any heretofore built, are to be completed and launched for demonstration flights all over the civilized world within the present year; and a naval contract for two American Zeppelins of great size is soon to be signed, and construction will be started before the end of the year," he said.

A real issue before the country at the present time, he said, is whether this nation shall strive for the lead in rigid-airship development and construction, or continue trailing behind the three airship-wise European nations.

"The development of the rigid airship started in Germany some thirty years ago," Mr. Betancourt said, "and as yet there is but one such craft in this country, the Los Angeles, and this was built in Germany. Great Britain, Germany and Italy are some three to five years ahead of us in airship building since the war. The reasons are obvious. As a German invention, the rigid airship was energetically developed into an efficient and safe craft which was used by the Germans during the war. England was near enough to the development of this new machine to give it serious study; but America was too far away to realize the possibilities of this form of aircraft. One good rigid airship was built in this country some five years ago; since then attempts have been made to interest the government in building more, but the people of the country at large do not know yet what the airship can do, or its possible use in our transportation system.

"No doubt, the world-wide demonstration of the three new European rigid airships will aid materially in clarifying the practical uses of airships. But it is certainly not to our credit to lag so far behind Europe in the development of airships.

"Another serious handicap is the cost of manufacturing this type of aircraft. Either Germany or England can build a rigid airship for about half as much as we can at present, because *(Turn to next page)*

No Matter

Logic

DR. VERNON KELLOGG in *Human Life As the Biologist Sees It* (Holt):

In Stanford University a number of years ago I used to walk down an avenue lined with trees—I believe they were trees—to the beautiful quadrangle of buildings, with a companion, now a distinguished professor of philosophy in an important Eastern University, who proved during our walk each morning by what was to me a verbally irrefutable logical argument that there were no trees along our way and no quadrangle before us. However, when after successfully avoiding the tree-trunks, we reached the quadrangle we entered it quite naturally and unsurprised, and went on under its arcades to take up our duties in our respective class rooms in it. We, or rather the professor of philosophy, had simply had a pleasant after-breakfast exercise in mental gymnastics. We had done our other gymnastics before breakfast.

Science News-Letter, July 14, 1928

Study as a Student Activity

Pedagogy

MAX MASON, ex-president of the University of Chicago, in his farewell address:

The American undergraduate shows great interest and energy in his self-managed extra-curricular affairs—the so-called "student activities." Our goal will be reached, when, in this sense of the word, the intellectual work of the college becomes a "student activity." Under such conditions the undergraduate college will stimulate and be stimulated by the work in graduate teaching and research. In graduate work, and in Senior College as well, students must study subjects rather than take courses. I believe that the University of Chicago has the opportunity of abandoning the childish game of marks and grades, and emphasizing the fact that education is fundamentally self-education, and that the university may well be defined as a set of personalities, capable of inspiring curiosity in students, together with physical facilities which enable students to satisfy their own curiosity by their own effort. While appreciable improvement has been produced in the institution of honor courses, we have still far to go in the direction of stimulating students to independent interest. The more able students in the Senior College may well be allowed participation in minor capacities in research work of the Faculty. The ideal toward which it is desirable to work is that of a group of problem-solvers, united in a real fellowship of learning—a group comprised of both Faculty and students participating in the solution of problems as their abilities allow, the students inspired to obtain knowledge because of their interest in the application of knowledge and technique which they see around them.

Science News-Letter, July 14, 1928

Scale in Architecture

Psychology-Architecture

WILLIAM ROGER GREELEY in *The Essence of Architecture* (Van Nostrand):

Great size is often impressive. There may be, in a given case, no insincerity in it. It may be proper, it may be "in style" and yet not "in scale" with the human element, or with its surroundings.

The new library in the Harvard Yard is a case in point. It is large; it needed to be. It is large because of a sincere and proper regard for the requirements of the problem. The style is accommodated to the size. Nevertheless, it is wrong in scale. It is like a grand piano in a two-room flat. The fault isn't with the piano or the flat, but with the "scale". The Harvard Yard has been established for centuries. Its choicest buildings are small in scale—almost domsetic. Its area is limited. The sudden intrusion of the great new library building is the same kind of violation of scale as the introduction of a trombone into a mandolin club. The fact that it is a perfectly good trombone doesn't help matters much, nor does the fact that it is well played. To be sure, involved in this violation of scale is a violation of propriety, also.

Science News-Letter, July 14, 1928

New Airship Era—*Cont'd*

this craft is still a largely hand-made product, and as yet machinery production methods have not been used. Our salvation will lie in expediting the development so that we can build our ships in groups of five or more from the same design, and of the same size, in order to be able to employ mass production methods and machinery. Our only ship, the Los Angeles, already some four years old, is small for demonstration work and though it is still doing wonderfully in the skilled hands of our little airship navy, it is so constantly employed in training personnel that it cannot be sent over the country to show people the possibilities of rigid airships.

"With these obstacles, the handful of the airship-wise and the airship engineers of the country have turned to academic problems. New experiments, unsupported by full-size tests and demonstrations have given rise to the discussion of academic problems while neglecting the opportunity for concerted effort to secure support to build full-size ships for demonstration purposes."

Science News-Letter, July 14, 1928

BINDER COVERS
FOR
SCIENCE NEWS-LETTER

Many subscribers have expressed a desire for a convenient binder in which to file their copies of the Science News-Letter. We therefore have prepared an attractive and durable loose-leaf binder-cover of gray leather-like stock, printed in dark green and complete with fasteners. Each binder-cover will hold one volume (six months or 26 issues).

To facilitate punching the issues of the Science News-Letter to fit this binder-cover, a pattern showing where holes should be placed appears each week on the back cover page.

To obtain a binder-cover, send 20 cents in stamps (make them 2s, please), together with your name and address (please print) to

SCIENCE SERVICE
21st and B Sts.
Washington, D. C.

Artificial Rubber Made in Germany

Chemistry

Copies of the two new patents taken out in Germany and England for making rubber artificially have been received by the Department of Commerce. The sensational announcement made a few months ago by Dr. von Weinberg, of the German dye trust, at the annual convention of the German Union of Chemical Industries that synthetic rubber would "soon appear on the world markets as a commercial commodity, equal to natural rubber and cheaper in cost" aroused the curiosity of American chemists and tire makers, but the text of these patents will not satisfy them, since they relate merely to the improvement of the final stages in the process of the conversion of well-known chemicals into caoutchouc and do not disclose any cheaper source of the raw material.

The only apparent novelty in the new process is in the methods of carrying out the combination of chemicals. In one patent they are suspended in water thickened with something like soap, starch or egg albumen at 150 degrees Fahrenheit, while a stream of oxygen gas is passed into the emulsion. According to the other patent dried isoprene is mixed with metallic sodium in glycerine in an atmosphere of carbon dioxide, and agitated until rubber results.

If the method of oxidizing an emulsion results in artificial rubber having the peculiar colloid structure of the latex of the rubber tree the product may possess the elasticity that has hitherto been lacking in the laboratory products. The materials mentioned, isoprene and related hydrocarbons, can be made from various known sources, such as petroleum, potatoes, tar, coal, corn, etc., but no process so far published will turn them into rubber as cheaply as it can be grown on plantations. If the great German combine, the Interessengemeinschaft Farbenindustrie, is able to accomplish this it is most likely done in connection with their plants for the production of synthetic petroleum by the hydrogenation of coal.

The Soviet Government offered a first prize of $50,000 and second prize of $25,000 for five pounds of synthetic rubber with the recipe delivered at Moscow before January 1, 1928, but no announcement of the awards has yet been made. Another prize of $25,000 was offered sometime ago through the London *Financier* for a method of making rubber cheaper than sixty cents a pound, but no claimant appeared for the prize.

Science News-Letter, July 14, 1928

"Bios", Yeast Vitamin, Crystallized

Physiological Chemistry

"Bios", a substance that promotes growth in yeast as vitamins do in animals, has been demonstrated to be really two substances, and one of these two "bioses" has been prepared in pure crystalline form in the laboratory of Prof. W. Lash Miller of the University of Toronto. It proves to be a form of a seldom-studied but long-known chemical compound, inosite.

In 1901, long before vitamins were discovered, a Belgian chemist named Wildiers found that yeast needed for growth small quantities of some unknown substance which he could not isolate. He gave to this unknown material the name "bios", which is the Greek word for "life." After the discovery of vitamins, scientists began to take interest in this vitamin-like stuff needed by yeast, but it still defied chemical analysis.

Then various researchers in Prof. Miller's laboratory began a systematic attack on the problem. One of them discovered that if a bios solution were shaken up with fine charcoal some of the bios vanished into the charcoal and what was left could not help yeast to grow. The part that was left could also be cleared out of the solution by other chemical means. This indicated that there was not one bios, but two; accordingly the names Bios I and Bios II came into use.

The latest advance has been to purify Bios I into crystal form. The crystals obtained have been analyzed and shown to contain the same proportions of carbon, hydrogen and oxygen as common glucose, but the chemical arrangement is much more complex.

Bios I, or inosite as it has now been proved to be, is abundant in young, vigorously growing plant shoots. The German investigators who first studied inosite obtained their material from bean sprouts. The Canadian scientists who purified Bios I and established its chemical identity bought up large quantities of tea siftings for their raw material.

Science News-Letter, July 14, 1928

Nature Ramblings

By Frank Thone

Natural History

Bittersweet

Bittersweet is a name most commonly given to the bright red-and-orange fruited vine that reaches its full glory in autumn and figures prominently in winter bouquets. This vine, sometimes called "wax-works", has fairly run off with the proper title of one of our most attractive late-spring and early-summer plants, which is the true bittersweet but now has to be contented with some such half-apologetic explanatory label as "bittersweet nightshade".

The true bittersweet is a member of the nightshade family, together with potatoes, tomatoes, eggplant, tobacco, ground-cherry and a host of other familiar and useful plants. It belongs to the same genus, *Solanum*, as the potato and the eggplant, and its second or specific name, *dulcamara*, is a literal translation of the English, except that the two words are reversed and in the Latin read "sweet-bitter". As a sort of botanical variant upon one of the oldest joke-themes in the world, it may be added that the bittersweet is sometimes called "matrimony vine", though by rights this title belongs to a closely related plant from China.

It would be carrying a joke too far, however, to call attention to the fact that the bittersweet is poisonous. Its leaves and green fruits contain an alkaloid related to nicotin, which in much attenuated doses soothes the nerves of humans but in more concentrated form is used to slaughter insects. This poisonousness apparently extends to most of its kindred, for even the leaves of tomatoes and potatoes have been known to sicken live stock reckless enough to eat them.

Science News-Letter, July 14, 1928

The Canadian Forest Service collected more than 9,500 pounds of tree seeds, or six billion seeds, for reforestation purposes last year.

The Meek Inherit

Evolution

JAMES J. MONTAGUE, in the *New York Herald-Tribune:*

The fox is wily and astute,
He lives by craft and stealth and loot.

He has far more than average wit
And makes the very most of it.

And well might any one expect
With such great wealth of intellect

That he'd outlive the quadrupeds
Which aren't so clever with their heads

And often stumble unawares
In traps and gins and nets and snares.

Yet soon he's due to disappear
From this mundane terrestrial sphere,

And with the creatures to be linked
Which now are stuffed and marked extinct.

The rabbit has but little sense,
He's noted for incompetence,

And yet though clumsy and unwise
He multiplies and multiplies

And promises to linger on
When every fox is dead and gone.

Which leads us sadly to admit
That now and then the most unfit

In this old world can get a start
On those who are too gosh-darned smart.

Science News-Letter, July 14, 1928

The Fossilized Teacher

Education

SIR WILLIAM OSLER, in *Counsels and Ideals:*

After all, no men among us need refreshment and renovating more frequently than those who occupy positions in our schools of learning. Upon none does intellectual staleness more readily steal "with velvet step, unheeded, softly," but none the less relentlessly. Dogmatic to a greater or less degree all successful teaching must be, but year by year, unless watchful, this very dogmatism may react upon the teacher, who finds it so much easier to say to-day what he said last year. After a decade he may find it less trouble to draw on home supplies than to go into the open market for wares, perhaps not a whit better, but just a wee bit fresher. After twenty years the new, even when true, startles, too often repels; after thirty—well, he may be out of the race, still on the track perhaps, even running hard, but quite unconscious that the colts have long passed the winning-post. These unrefreshed, unregenerate teachers are often powerful instruments of harm, and time and again have spread the blight of blind conservatism in the profession. Safely enthroned in assured positions, men of strong and ardent convictions, with faithful friends and still more faithful students, they too often come within the scathing condemnation of the blind leaders of the blind, of those who would neither themselves enter into the possession of new knowledge nor suffer those who would to enter. The profession has suffered so sorely from this blight of old fogeyism that I may refer to the most glaring instance in our history. In the scientific annals of this great metropolis there is no occasion more memorable than April 16, 1616, when Harvey began his revolutionary teaching. Why the long, the more than Horatian delay, in publishing his great discovery? He knew his day and generation, and even after twelve years of demonstration, which should have disarmed all opposition, we know how coldly the discovery was received, particularly in certain quarters. Harvey, indeed, is reported to have said that he did not think any above forty years of age had accepted the new truth. Many of us have lived through and taken part in two other great struggles. The din of battle over the germ theory of disease still rings in our ears. Koch's brilliant demonstration of the tuberculosis bacillus had a hard uphill fight to recognition. The vested interests of many minds were naturally against it, and it was only the watchers among us, men like Austin Flint, who were awake when the dawn appeared. It is notorious that the great principles of antiseptic surgery have grown slowly to acceptance, and nowhere more slowly than in the country in which they were announced, the country which has the great honour to claim Lord Lister as a citizen. Old fogeyism of the most malignant type stood in the way, and in some places, strange to stay, still stands.

Science News-Letter, July 14, 1928

A Teaching Elephant

Zoology

TH. KNOTTNERUS-MEYER, in *Birds and Beasts of the Roman Zoo* (Century):

One day near Hagenback's *Tierpark* a motor-car ran into a ditch and then stuck fast. The chauffeur suddenly bethought himself of asking Hagenback for assistance. Hagenback sent his trusty working elephant Ruma, a splendid female, and Ruma did herself credit. She quietly pressed her forehead against the back of the car and pushed it, without any appearance of exertion, out of the ditch and up on the causeway. . . .

What I have said of the great cats is true of the elephants also, and indeed of all sorts of animals—namely, they cannot endure to be shouted at. The hearing of animals, the elephant included, is so sensitive that we can speak to them quite softly and be plainly understood. The Indian mahout speaks quietly to his elephant, emphasizing his orders by kicking the beast behind the ears with his naked feet. The belief that one must necessarily shout at so huge an animal is of course comprehensible, but it is entirely erroneous.

Like all trained elephants, Ruma was a good teacher. One day some other elephants were roped to her in order to take them for a walk in the *Tierpark* and accustom them to walking in the open. The first to be roped to her was Minnie, an almost full-grown female, who was followed by a couple of smaller animals. The Indian mahout sat on Ruma's neck. They set out in good order, but things soon went amiss. Minnie took fright at something, thrust her ears forward, trumpeted in terror, and tried to turn about. Ruma straightway turned round, beat Minnie soundly with her trunk, and pushed her into place again; indeed, the mahout had some difficulty in restraining Ruma's rather violent educational zeal. However, Minnie understood that resistance was useless, and after a few more lessons of this kind from Ruma she learned to accompany her willingly.

Science News-Letter, July 14, 1928

FIRST GLANCES AT NEW BOOKS

FLOWER FAMILIES AND ANCESTORS —Frederic E. Clements and Edith S. Clements—*Wilson*. This well-known team of ecologists has done here what Fabre did for insects and Seton for mammals. They have written a natural history of flowers which the layman can read with delight and the student with profit. The text is built largely around the Clements' recent studies on pollination, plus Prof. Clements' development of Bessey's phylogenetic concepts. The simple fact that the book contains some sixty line drawings by Mrs. Clements is sufficient in itself to sell it to a very large section of the botanical and flower-loving public.

Botany
Science News-Letter, July 14, 1928

FUNDAMENTALS OF BIOLOGY—Arthur W. Haupt—*McGraw Hill* ($3). This is a solidly written, clearly illustrated text in general biology. Written for college freshmen, it shuns an overload of detail but at the same time makes no watered-down concessions. It is gratifying also to note that there is none of the timidity before anti-evolution clamor which a couple of years ago was driving many authors and publishers to half-measures and evasions.

Biology
Science News-Letter, July 14, 1928

AMERICAN SILURIAN CRINOIDS—Frank Springer—*Smithsonian Institution*. A thorough-going, scholarly monograph of these important and beautiful fossils, printed and illustrated in a manner worthy of the Smithsonian tradition.

Paleontology
Science News-Letter, July 14, 1928

WILD BIRDS INTRODUCED OR TRANSPLANTED IN NORTH AMERICA—John C. Phillips—*Govt. Printing Office* (10c). This pamphlet tells the story of the introduction of useful game and ornamental birds, as well as of such pests as the English sparrow and the starling.

Ornithology
Science News-Letter, July 14, 1928

PEEPS AT THE "ZOO" AQUARIUM—A. E. Hodge—*A. & C. Black* (2s 6d). A well written and excellently illustrated handbook, telling about some of the finny oddities to be found at the aquarium of the London Zoo.

Ichthyology
Science News-Letter, July 14, 1928

AN ADVENTURE IN PYRAMIDS—William Hempstead Porterfield—*A. and C. Boni* ($2). A novelette of newspaper life written from inside experience by the brilliant California journalist whose meteoric rise from the ranks of reporting to the editorship of half a dozen papers was cut short by his untimely death last fall.

Journalism
Science News-Letter, July 14, 1928

AMERICAN INQUISITORS — Walter Lippmann—*Macmillan* ($1.25). Using the Dayton trial and the Chicago schoolbook furor as his texts, Mr. Lippmann inquires penetratingly and often disquietingly into our fundamental assumptions of the role of education in a democracy. His discussion *in propria persona* is interspersed with salty Dialogs on Olympus led by Socrates, and participated in by such persons as Jefferson, Bryan, Modernist and Fundamentalist.

Education
Science News-Letter, July 14, 1928

ALUMINUM COMPOUNDS IN FOOD—Ernest Ellsworth Smith — *Hoeber* ($7). A comprehensive contribution to the fiercely fought controversy between powerful financial interests as to the influence of aluminum in food. The author, after collating the chemical and medical evidence, comes to the conclusion that the use of aluminum cooking utensils is harmless and that the so-called alum baking powders are no less wholesome than other varieties.

Chemistry
Science News-Letter, July 14, 1928

STUDIES ON OXIDATION-REDUCTION I-X. *Bulletin No.* 151, *U. S. Hygienic Laboratory*. A 350-page volume containing the first ten papers of the series of studies on biological oxidation by electrical methods with full biographies of the subject.

Chemistry
Science News-Letter, July 14, 1928

THE PHILIPPINES TODAY—Robert W. Hart—*Dodd, Mead* ($2.50). The author, who is a surgeon in the U. S. Public Health Service, undertakes to give, in brief compass, a view of the social and economic conditions in the Philippines, with sufficient treatment of geographic and historic facts to serve as background. He is opposed to granting the islanders independence.

Sociology
Science News-Letter, July 14, 1928

NAUTICAL ALMANAC AND ASTRONOMICAL EPHEMERIS FOR 1930—*H. M. Stationery Office* (5s.). In the 1929 edition of this astronomer's bible published by the British Government, a number of changes to increase the convenience of the book were introduced. The 1930 edition continues these and introduces a few further improvements.

Astronomy
Science News-Letter, July 14, 1928

HYDROGRAPHIC MANUAL — J. H. Hawley—*U. S. Government Printing Office* (45c). One of the chief functions of the U. S. Coast and Geodetic Survey is hydrographic surveying, which includes soundings to determine depths of waters through which ships must pass, and the orientation of these soundings with respect to shore positions. This book, while prepared by the Survey for the specific purpose of instructing their men in the methods, is none the less of interest to the layman who wants to know how it's done, or even to the amateur navigator who wants to try it himself.

Hydrography
Science News-Letter, July 14, 1928

STANDARDS YEARBOOK, 1928—Bureau of Standards—*U. S. Government Printing Office* ($1). The second edition of this now annual work tells of the present-day standardizing activities, not only of the Bureau of Standards itself, but also of other agencies of the Federal Government and the States, counties and municipalities, and technical societies and trade organizations. Their accomplishments during 1927 are related, and special attention is paid to their programs for future work.

Engineering
Science News-Letter, July 14, 1928

THE BRIDE OF THE SACRED WELL Emma Lindsay Squier—*Cosmopolitan* ($2.00). Folk tales of ancient Mexico embellished by a novelist's fancy.

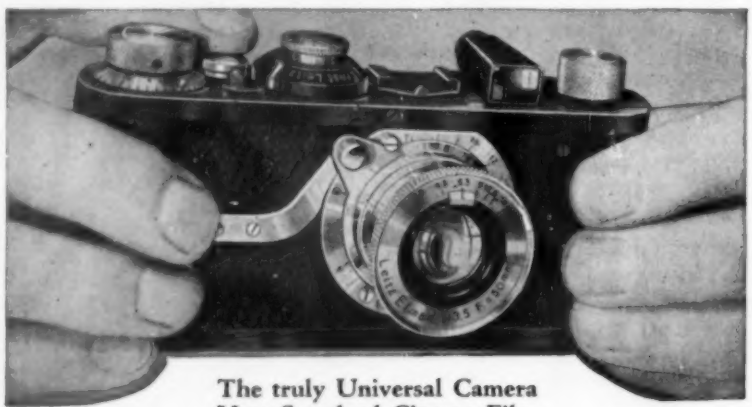
Archæology
Science News-Letter, July 14, 1928

ABSTRACTS OF THESES, THE UNIVERSITY OF CHICAGO, 1925-1926—*Univ. of Chicago Press* ($3). A new volume in the series issued by the University of Chicago, making available in compact form the meat of theses submitted during the academic year 1925-26.

History of Science
Science News-Letter, July 14, 1928

Leica

"The Universal Camera"



The truly Universal Camera
Uses Standard Cinema Film

Ideal for Vacation, Travel and Pictorial Work

In addition, the "Leica" Camera

Meets All the Varied Demands

Equally dependable for Speed Photography, Ordinary Snapshots, Copying, General Record Work or Photomicrography.

***Any "Leica" Negative can be enlarged to* 12x18".**

The "Leica" Fits the Vest Pocket

With "Leica" negatives, one can make transparency rolls for projecting pictures in size up to ten feet for class instruction or entertainment.

Ask for Booklet No. 1127 (NL) and Learn How
"The 'Leica' can solve your photographic problem."

E. LEITZ, Inc.
60 East Tenth Street
NEW YORK, N. Y.

Agents for Pacific Coast States:

811 West 7th Street, Los Angeles, Calif. — **SPINDLER & SAUPPE** — **86 Third Street, San Francisco, Calif.**

THE LIVING TEXTBOOK

Nothing will vitalize science teaching more than a close contact with the actual frontier of man's intellectual conquest of nature.

When earthquakes destroy, physicists probe, chemists create, archæologists dig, biologists discover, or philosophers think, the results of their labors are reported in the

SCIENCE NEWS-LETTER

No better supplementary reading can be provided for pupils in general science, chemistry, physics, biology, or any other science.

Even the history of science is vitalized by the "Classics of Science" which give the details of epochal discoveries in science in the exact words of the great scientists.

Every student should be given his own copy of the Science News-Letter to clip, read and absorb.

Reduced subscription rates for class orders of 10 copies or more to the same address are only 5 cents a copy per week (only $1.80 for the school year).

Enough samples for the entire class will be sent in September if you write now to:

Subscription Department

SCIENCE NEWS-LETTER

21st and B Sts.

Washington, D. C.

Gilsonite, an odd mineral used in making telephone mouthpieces, electrical insulation, paint and knobs, is mined only in the state of Utah.

An expedition has sailed from New York to dredge the ocean bottom in the region of the Azores, seeking the supposedly lost continent of Atlantis.

Traffic policemen in the town of Bath, England, carry an electric light signal on their helmets to make them clearly visible to drivers at night.

If disease could be eliminated from the silkworms of China, it is estimated that the country's silk production could be increased 400 per cent.

CLASSICS OF SCIENCE: Loeb's Fatherless Frogs

Biology

This is the account of the first two tadpoles raised by Dr. Loeb from eggs "fertilized" by a pin-prick. By 1921, from many thousand eggs so treated, he had succeeded in raising more than 20 normal adult frogs. Duplication of his experiments requires, besides endless patience, little more apparatus than a microscope, a platinum needle and a bowl of water.

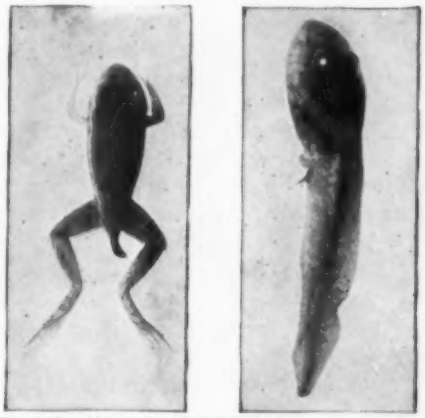
ARTIFICIAL PARTHENOGENESIS AND FERTILIZATION, by Jacques Loeb, member of the Rockefeller Institute for Medical Research. Originally translated from the German by W. O. Redman King, B. A., Assistant Lecturer in Zoology at the University of Leeds, England, supplemented and revised by the author. Chicago, 1913.

Experiments with Invertebrates

The experiments thus far considered have shown that it is possible to imitate the activating effect of the spermatozoon upon the egg of the sea-urchin approximately by submitting the egg to two different processes. The first process consists in calling forth the membrane formation in the egg by a fatty acid (or as we shall see later by a number of other chemicals). This process seems to be the essential feature in the activation of the egg, since it suffices to set in motion the whole apparatus of nuclear and cell division. The second process has only a corrective effect, since the membrane formation alone leads to a rapid disintegration of the egg, unless the temperature is very low. The prevention of this disintegration is brought about by the second process. This second process consists in submitting the egg for a short period to a hypertonic solution containing oxygen (or for a longer period to sea-water free from oxygen).

We will now briefly mention some cytological points worthy of discussion. E. Hindle has investigated the cytological changes in the eggs of *S. purpuratus* which had been treated with butyric acid and subsequently with a hypertonic solution. He found that the changes taking place in such eggs were almost identical with those which take place after the entrance of a spermatozoon. Hindle gives the following description:

The interval (about 20 minutes) between the transference of the eggs from butyric acid to normal sea-water and their subsequent treatment with hypertonic salt solution is characterized by the alterations in the appearance of the cytoplasm and nucleolus, and the subsequent development of a perinuclear zone, as described above. The nucleus then commences to grow and faint radiations can sometimes be seen extending from the perinuclear zone into the surrounding cytoplasm.



FROG AND TADPOLE from eggs fertilized by a pinprick

During immersion in the hypertonic solution there are no apparent changes beyond a slight reduction of the clear zone of hyaloplasm surrounding the nucleus.

After the eggs are put back into normal sea-water the internal changes resulting in the first cleavage follow each other in quick succession. The first change noticed is an increase in the development of the perinuclear zone, followed by further growth of the nucleus. Meanwhile, the meshwork of chromatin becomes coarser and more aggregated together and the nucleolus gradually disappears. This stage is succeeded by a reduction of the perinuclear zone together with its radiations.

About half an hour after transference to normal sea-water, from one pole of the nucleus a definite aster begins to develop, its rays focusing in a more or less indistinct centrosome situated on the nuclear membrane. By division of the centrosome a typical amphiaster is formed in the nuclear area and as it develops the nuclear membrane disappears. At the same time the chromatin assumes the form of a spireme, which subsequently breaks up into about 18 long and slender chromosomes. At this stage it is impossible to clearly distinguish their number, but, as the chromosomes are gradually drawn into the equator of the cleavage amphiaster, they shorten considerably and become quite distinct by the time that the equatorial plate is formed.

At this stage we have made numerous counts of the chromosomes and invariably found it in the neighborhood of 18, which is half the number that is normally present in this species.

This behavior is very similar to the one found in the egg after fertilization by sperm.

In naturally fertilized eggs a distinct aster (cleavage aster) appears at one pole of the nucleus, its rays centering in a clear area which represents a diffuse centrosome. This area divides and the two halves move apart until they come to lie at opposite sides of the nucleus and form the poles of a typical amphiaster which is developed in the nuclear region. Meanwhile the chromatin assumes the form of a spireme, which breaks up into 36 chromosomes that arrange themselves about the equator of this amphiaster to form a nuclear spindle. In the chemically fertilized eggs a nuclear spindle arises in a similar way and the chromatin assumes the form of a spireme preparatory to breaking up into chromosomes, but, instead of 36, only 18 of these latter bodies appear. The subsequent changes are identical in both kinds of eggs. The chromosomes split longitudinally and each half moves along the spindle fibres toward its respective pole. As they approach the poles the chromosomes swell up and eventually fuse together to form a single nucleus in the region occupied by each of the diffuse centrosomes. Meanwhile a cell wall develops between the two nuclei dividing the cytoplasm into two, and finally the spindle fibres disappear. The succeeding processes of development, both internal and external, are similar in both naturally and chemically fertilized eggs, with the exception that at each succeeding division only 18 chromosomes appear in the latter instead of the normal number, 36.

Parthenogenesis in Frogs' Eggs

During the first years of his work and later the writer vainly applied the chemical methods of artificial parthenogenesis to the eggs of fishes and of frogs. The reason for this failure may possibly lie in the relative impermeability of the walls of these eggs for the chemicals used. The walls of the eggs of *Fundulus* are, as long as they are normal, not only impermeable for salts but also for water. It seemed desirable that a method of artificial parthenogenesis for vertebrates should be found since it is so much easier to raise the larvae of vertebrates than of invertebrates. It is under the circumstances no surprise that such a method was found almost accidentally. In 1907 Guyer published a paper in which he reported that by injecting lymph or blood into the unfertilized eggs of frogs he succeeded in starting development and even in obtaining two tadpoles. Considering the importance of these experiments and since they seem to have been overlooked, the writer feels justified in quoting part of Guyer's note:

During three successive springs (1905-7) the writer has experimented on unfertilized frog eggs by injecting them with blood or lymph of either male or female frogs. In all some fifteen hundred eggs have been so operated upon. Shortly before the time for laying, the eggs were taken from the uterus with every precaution to prevent contamination by sperm. Those nearest the cloacal opening were always set aside as a control and in not a single instance (*Turn to next page*)

Loeb's Fatherless Frogs—*Continued*

did any of them develop. The other eggs were pricked with a very fine-pointed capillary tube which had previously been charged with lymph and corpuscles by dipping it into the lymph or the blood of another frog.

In eggs so treated numerous instances of cell proliferation and embryonic development have been observed, provided the eggs were fully matured and ready for fertilization. Many eggs after six or eight days showed upon sectioning that they had approximated the full blastular and in some cases the gastrular stages, although the condition came about apparently by some sort of internal nuclear arrangement, as no superficial cleavage furrows were observable and no demarkation into cells was visible from the exterior until the third or fourth day, when close inspection showed in some cases numerous small vesicular or cellular outlines.

In some instances definite organs were developed, though frequently distorted and misplaced. Cross-sections of one embryo, for example, showed such pronounced defects as two neural tubes anteriorly. Of the whole number of eggs operated upon only two developed into free-swimming tadpoles and these were apparently normal as far as superficial examination disclosed. They have not yet been sectioned. After sixteen days one died and the other was killed to insure proper fixation for histological study.

Apparently the white rather than the red corpuscles are the stimulating agents which bring about development, because injections of lymph, which contains only white corpuscles, produce the same effect as injections of blood. Whether or not the fluid part of the lymph or blood produced any effect could not be definitely determined from the material at hand.

Guyer thought that probably the cells which he introduced were developing and not the egg. He did not recognize that his experiment was a case of artificial parthenogenesis. This, however, does not detract from the fact that he was the first to cause the development of the unfertilized egg of the frog by puncturing it, that he introduced blood into the egg for this purpose, and that he succeeded in producing two parthenogenetic tadpoles.

Guyer's results were to a large extent confirmed by Bataillon. Bataillon found that mere puncturing of the egg of the frog by a very fine needle could not produce any embryogenesis but that a second factor was necessary, namely, that some of the body liquids (blood of the frog or newt or fish) have to enter the egg. "A considerable percentage of the eggs of *Rana*, touched with the blood and immediately punctured, will develop, while the same eggs squeezed out from the female frog will not develop (when punctured)." Bataillon states that in the eggs thus treated "he found at the beginning of the divisions outside the kinetic figures, chromatin fragments accompanied by asters, which fragments come probably from elements inoculated with the needle." In a recent paper Bataillon reaches the conclusion that it is the leucocytes which cause the development (1913). . . .

While the number of eggs which begin to segment when punctured is not inconsiderable, very few reach the tadpole stage. There is a difference in the response of the eggs of various kinds of frogs to this treatment.

The number of unfertilized eggs which began to segment after puncture was according to Loeb and Bancroft greater in the wood frog than in the leopard frog, and amounted in the most favorable cases to about 40 per cent in the former. Only 2 of about 10,000 punctured eggs of the wood frog reached the tadpole stage, but these died before they were able to swim. The percentage of eggs of the leopard frog which reached the tadpole stage was greater. From 700 punctured eggs of the Southern leopard frog, 13 good morulae were isolated the next day. On the third day, when the fertilized controls were in the gastrula stage, 13 unfertilized punctured eggs were also in the gastrula stage and 4 more eggs were developing abnormally. On the fourth day, 8 of the parthenogenetic eggs had good medullary folds and 4 had irregular folds. On the sixth day most of the fertilized eggs hatched and 8 of the parthenogenetic eggs hatched also. Of these latter, 4 were developing regularly and 4 irregularly. Those that had not hatched were abnormal.

On the eighth day, the larvae arising from the fertilized eggs were swimming. Among the larvae arising from the unfertilized punctured eggs only 3 were normal, and their development was slightly retarded, perhaps one day. In addition, 6 parthenogenetic larvae were abnormal but still alive.

On the thirteenth day, 2 of the parthenogenetic larvae were feeding and these were the only ones which survived definitely. The other parthenogenetic larvae all died during the next few days. Of the 2 surviving larvae, one went through metamorphosis after five months. When it died, the tail was almost completely absorbed (Fig. 76). Its death was probably accidental. The other lived (Fig. 77) a month longer and formed small hind legs, but died in the tadpole stage. A repetition of these experiments by the same authors showed that only the eggs of *Rana sphenocephala* and *R. pipiens* produce tadpoles when punctured, while the unfertilized eggs of *R. silvatica, Chorophilus feriarum*, and of *Bufo americanus* only begin to segment but die before the tadpole stage when they are punctured.

As far as the effect of puncturing the egg is concerned, it may be comparable to the effect of agitation upon the starfish egg. The latter forms a membrane as an effect of agitation and it may be that the destruction of the surface layer of the frog egg is the essential feature in this "traumatic" parthenogenesis. While the spermatozoon causes the destruction of the cortical layer of an egg by a chemical substance (a "lysin"); and while the same can be accomplished in the egg of some starfish and some annelids by gentle agitation, in the egg of the frog it can be done by puncturing the surface layer. Future experiments will decide whether or not the leucocytes play the rôle of the second factor which Bataillon ascribes to them.

Loeb and Bancroft tried to ascertain the sex of the parthenogenetic frog and tadpole which they obtained. The gonads contained eggs in both cases. This at first sight might be taken to indicate that both were females, but the problem is complicated by the fact found by Pflüger, and recently worked out by Kuschakewitsch, that very often in the early stages the gonads of a frog may contain eggs which afterward degenerate. Such "intermediates" may develop into males.

Jacques Loeb was born in Alsace, April 7, 1859, and died in Hamilton, Bermuda, February 11, 1924. He studied medicine at the Universities of Munich and Strasbourg, taking his degree of M. D. in 1884. After teaching in Wurtzburg and Strasbourg, he worked at the biological station at Naples from 1889 to 1891. He then came to America, taught at Bryn Mawr for one year, and joined the faculty of the University of Chicago in 1892. In 1902 he became professor of physiology at the University of California. In 1910 he became head of the division of physiology at the Rockefeller Institute for Medical Research.